WHAT IS CLAIMED IS:

1. A method for mapping electrical activity within a tubular region of or near the heart having an inner circumference, the method comprising:

inserting into the heart a distal end of a catheter comprising:

an elongated tubular catheter body having an outer wall, proximal and distal ends, and at least one lumen extending therethrough, and

a mapping assembly comprising:

a tubular structure having a generally straight proximal region attached to the catheter body, a generally straight circular main region generally transverse and distal to the proximal region having an outer circumference, a transition region connecting the proximal region and the main region, and a generally straight distal region distal the main region and comprising a tightly wound coil spring, wherein the tubular structure comprises a non-conductive cover over at least the main region of the mapping assembly,

a support member having shape-memory disposed within at least the main region of the mapping assembly, and

a plurality of spaced-apart electrodes carried by the generally circular main region of the mapping assembly.

2. A method according to claim 1, wherein the distal region is more flexible than the main region.

3. A method according to claim 1, wherein the generally straight distal has an atraumatic design to prevent the distal end of the mapping assembly from penetrating tissue.

4. A method according to claim 1, wherein the coil spring is contained within the non-conductive covering.

5. A method according to claim 1, wherein the generally straight distal region has a length ranging from about 0.25 inch to about 1.0 inch.

6. A method according to claim 1, wherein the mapping assembly comprises a plurality of electrodes carried by the generally circular main region of the mapping assembly, wherein the electrodes are generally evenly spaced about the entire circumference of he mapping assembly such that, in use, wherein the mapping assembly is positioned in a tubular region of or near the heart, with the outer circumference of the generally circular main region in contact with the inner circumference of the tubular region, the electrodes can be used to map the inner circumference of the tubular region.

7. A method according to claim 6, wherein the circular main region has first and second ends, and further wherein a first electrode is positioned on the generally circular main region a distance of no more than about 55° from the first en, a second electrode is positioned on the generally circular main region a distance of no more than about 55° from the second end, and a plurality of additional electrodes are approximately evenly spaced along the length of the generally circular main region between the first electrode and the second electrode.

8. A method according to claim 7, wherein the first electrode is positioned on the generally circular main region a distance of no more than about 48° from the first end, and the second electrode is positioned on the generally circular main region a distance of no more than about 48° from the second end.

9. A method according to claim 7, wherein the first electrode is positioned on the generally circular main region a distance ranging from about 15° to about 36° from the first en, and the second electrode is positioned on the generally circular main region a distance ranging from about 15° to about 36° from the second position.

10. A method according to claim 1, wherein the generally circular main region has an outer diameter ranging from about 10 mm to about 25 mm.

11. A method according to claim 1, wherein the generally circular main region has an outer diameter ranging from about 12 mm to about 20 mm.

12. A method according to claim 1, wherein the number of electrodes along the generally circular main region ranges from about 6 to about 20.

13. A method according to claim 12, wherein the electrodes are approximately evenly spaced around the generally circular main region.

14. A method according to claim 1, wherein the number of electrodes along the generally circular main region ranges from about 8 to about 12.

15. A method according to claim 14, wherein the electrodes are approximately evenly spaced around the generally circular main region.

16. A method according to claim 1, wherein the catheter further comprises means for deflecting the distal end of the catheter body without altering the shape of the mapping assembly.

17. A method according to claim 16, wherein the deflecting means comprises:

a puller wire extending through a lumen of the catheter body, said puller wire being fixedly attached at its distal end to the catheter body near the catheter body's distal end; and

a control handle for moving the puller wire longitudinally relative to the catheter body to thereby cause deflection of the distal end of the catheter body.

18. A method according to claim 17, wherein the control handle comprises a first member fixedly attached to the proximal end of the catheter body and a second member that is movable relative to the first member.

19. A method according to claim 1, wherein the tubular region is selected from the group consisting of pulmonary veins, the coronary sinus, the superior vena cava, and the inferior vena cava.

20. A method according to claim 1, wherein the tubular region is a pulmonary vein.

21. A method according to claim 1, wherein at least about 50% of the outer circumference of the generally circular main region is in contact with the inner circumference of the tubular region.

22. A method according to claim 1, wherein at least about 70% of the outer circumference of the generally circular main region is in contact with the inner circumference of the tubular region.

23. A method according to claim 1, wherein at least about 80% of the outer circumference of the generally circular main region is in contact with the inner circumference of the tubular region.

24. A method according to claim 1, wherein the generally circular main region consists of a single generally circular curve.

25. A method according to claim 1, wherein, when the catheter is viewed from the side with the catheter body positioned at the top of the generally circular main region, the catheter body forms an angle with the generally circular main region ranging from about 75° to about 95°.

26. A method according to claim 1, wherein, when the catheter is viewed from the side with the catheter body positioned at the top of the generally circular main region, the catheter body forms an angle with the generally circular main region ranging from about 83° to about 93°.

27. A method according to claim 1, further comprising an intermediate section between the catheter body and the mapping assembly, the intermediate section having at least one lumen extending therethrough and being more flexible than the catheter body.

28. A method according to claim 27, wherein the intermediate section has three lumens extending therethrough.

29. A method according to claim 1, wherein the tubular region is the pulmonary vein and at least about 50% f the outer circumference of the generally circular main region is in contact with the inner circumference of the pulmonary vein.

30. A method according to claim 29, wherein the generally circular main region has an outer diameter ranging from about 10 mm to about 25 mm, and the number of electrodes along the generally circular main region ranges from about 6 to about 20.

31. A method according to claim 29, wherein the generally circular main region has an outer diameter ranging from about 12 mm to about 20 mm, and the number of electrodes along the generally circular main region ranges from about 8 to about 12.

32. A method for mapping electrical activity within a tubular region of or near the heart having an inner circumference, the method comprising:

inserting into the heart a distal end of a catheter comprising:

a tubular structure comprising a generally circular main region having first and second ends, the generally circular main region being generally transverse and distal to the catheter body and having an outer circumference and a generally straight distal region distal to the main region, wherein the tubular structure comprises a non-conductive cover over at least the main region of the mapping assembly,

a support member having shape-memory disposed within at least the main region of the mapping assembly, and

a plurality of electrodes carried by the generally circular main region of the mapping assembly, wherein a first electrode is positioned on the generally circular main region a distance of no more than about 55° from the first end, a second electrode is positioned on the generally circular main region a distance of no more than about 55° from the second end, and a plurality of additional electrodes are approximately evenly spaced about an entire circumference

and along the length of the generally circular main region between the first electrode and the second electrode, such that, in use, when the mapping assembly is positioned in a tubular region of or near the heart, with the outer circumference of the generally circular main region in contact with the inner circumference of the tubular region, the electrodes can be used to map the inner circumference of the tubular region;

contacting the entire circumference of the mapping assembly with the inner circumference of the tubular region; and

mapping the electrical activity within the tubular region with the plurality of electrodes.

33. A method for mapping electrical activity within a tubular region of or near the heart having an inner circumference, the method comprising:

inserting into the heart a distal end of a catheter comprising:

an elongated tubular catheter body having an outer wall, proximal and distal ends, and at least one lumen extending therethrough,

a mapping assembly comprising:

a tubular structure having a generally circular main region generally transverse and distal to the catheter body, the generally circular main region having first and second ends and an outer circumference, wherein the tubular structure comprises a non-conductive cover over at least the main region of the mapping assembly,

a support member having shape-memory disposed within at least the main region of he mapping assembly, and

a plurality of electrodes carried by the generally circular main region of the mapping assembly, wherein a first electrode is positioned on the generally circular main region a distance of no more than about 48° from the first end, a second electrode is positioned on the generally circular main region a distance of no more than about 48° from the second end, and a plurality of additional electrodes are approximately evenly spaced along the length of the generally circular main region between the first electrode and the second electrode, and

means for deflecting the distal end of the catheter body without altering the shape of the mapping assembly;

contacting the outer circumference of the generally circular main region of the mapping assembly with the inner circumference of the tubular region; and

mapping the electrical activity within the tubular region with the plurality of electrodes.

34. A method for mapping electrical activity within a tubular region of or near the heart having an inner circumference, the method comprising:

inserting into the heart the distal end of a catheter comprising:

an elongated flexible tubular catheter body having an axis and proximal and distal ends,

a mapping assembly at the distal end of the tubular body having a preformed generally circular curve having first and second ends and an outer surface, being generally transverse to the axis of the catheter body, and having proximal and distal ends and carrying a plurality of spaced apart electrodes, wherein the first electrode is positioned on the generally circular curve a distance ranging from about 15° to about 36° from the first end, and the second electrode is positioned on the generally circular curve a distance ranging from about 15° to about 36° from the second end,

an electrode lead wire associated with each electrode, each electrode lead wire having proximal and distal ends and extending through the catheter body and into the mapping assembly, the distal ends of each electrode lead wire being electrically connected to its associated electrode,

a puller wire having proximal and distal ends extending through the tubular catheter body, the distal end of the puller wire being fixedly attached to the distal end of the catheter body, and

a handle connected to the proximal ends of the catheter body and puller wire for moving the puller wire longitudinally relative to the catheter body, whereby longitudinal movemment of the puller wire relative to the catheter body results in deflection of the distal end of the catheter body;

contacting the outer surface of the generally circular curve of the mapping assembly with the inner circumference of the tubular region; and

mapping the electrical activitiy within the tubular region with the plurality of electrodes.